

What is claimed is:

1. A glucose quantification device for determining the
5 concentration of glucose in a liquid medium comprising a
reference electrode; a counter electrode and a working
electrode with a semipermeable membrane immersed in a liquid
medium in which at least one chemical entity is dissolved; a
potentiostat for applying a measurement potential to the
10 working electrode relative to the reference electrode
corresponding to a measurement voltage during at least a
portion of measurement period, and thereby causing said
chemical entity to participate in an electrochemical reaction
at the working electrode, said electrochemical reaction
15 resulting in a impedance measurement evoked current, a
measuring unit for said impedance measurement evoked current;
and a means for comparing said impedance measurement evoked
current with a predetermined value to obtain a comparison
result.
- 20 2. The glucose quantification device of claim 1 wherein
the liquid medium is blood.
3. The glucose quantification device of claim 1 wherein
the chemical entity is glucose.
- 25 4. The glucose quantification device of claim 1 wherein
the working electrode comprises a semiconductor wherein the
semiconductor surface is covered with immobilized
Concanavalin A which binds glucose.
5. The glucose quantification device of claim 4 wherein
30 the semipermeable membrane allows for free diffusion of

micromolecules but prevents macromolecules from contacting the Concanavalin A surface.

6. The glucose quantification device of claim 1 wherein the working electrode is a silicon chip containing at least
5 one surface covered with a thin layer of silicon oxide.

7. The glucose quantification device of claim 1 wherein the reference electrode is Ag/AgCl.

8. The glucose quantification device of claim 1 wherein the counter electrode is platinum.

10 9. A glucose quantification device of claim 1 further comprising a feedback loop pump which administers an amount of insulin to a patient to modulate the glucose levels

10. A method of modulating glucose in a patient comprising:

15 a) immersing a glucose quantification device comprising a reference electrode; a counter electrode and a working electrode with a semipermeable membrane in a liquid medium in which at least one chemical entity is present;

b) applying a measurement potential to the working
20 electrode relative to the reference electrode to result in a impedance measurement evoked current;

c) measuring said impedance measurement evoked current;

d) comparing said impedance measurement evoked current with a predetermined value to determine whether the chemical
25 entity in the liquid medium is within a normal range;

e) administering an amount of insulin to the patient to modulate the concentration of the chemical entity in the liquid medium and regulate glucose levels.

11. The method of claim 10 further comprising the step
5 of determining the T_m by continuously determining the impedance measurement evoked current value over a period of time while increasing the temperature of the liquid medium.